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Obituary: Sir Frederick Banting.

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Sir HENRY DALE, P.R.S., writes:

It is sad to think that Banting has gone from us in what should have been still his scientific prime, though the dramatic end is not without its fitness to a career of research which had an unusual tinge of romance. The death of Keith Lucas in a flying accident in 1916 comes to mind, but with a suggestion of contrast more than of analogy. Lucas, at the age of 37, by work of increasing depth and brilliance over a decade, had given new form and substance to a whole range of fundamental physiology; to those who knew, he was already a master, but to the world at large his work meant nothing. Banting, who has died in his fiftieth year, was already a world celebrity in his earliest thirties. Rightly, as I think, the world gave him the biggest share of the credit for a great discovery, which brought about what is still the most dramatically sudden change in the aspect of a disease within living memory. Banting, however, had but little preparation for such an achievement, and his direct share in its development was relatively brief.

The year 1915 had found him still a medical student, and he served in France as a combatant; being wounded so severely as nearly to lose an arm, before he completed his qualification. By 1921, when the vision came to him, he seemed to be settled in medical practice in London, Ontario, with only a spare-time contact with the Department of Physiology there. The idea which had set his imagination aflame was not, in fact, a completely new one. Even its basal assumption that the action of trypsin had been responsible for frustrating earlier attempts to extract the anti-diabetic hormone from the pancreas has not survived the progress of knowledge; but this progress itself became possible only as a result of Banting's enterprise and determination. Carbohydrate physiology, in the thirty years following Minkowski's fundamental discovery, had left a trail strewn with the wreckage of attempts, many by workers of ripe experience, to extract the supposed hormone from the pancreas; and this was the problem which Banting, with no previous experience at all, was eager to tackle anew. When Macleod was asked to give him room for the attempt in the Toronto laboratory it would be natural for him to warn Banting, as he is said to have done, that this dismal history left little hope of success. It is more pertinent, I think, to remember that Macleod did, in any case, give Banting the chance of a trial, and, more important still, that he advised him to accept collaboration with a younger man, Charles Best, recently schooled under Macleod in methods of determining blood sugar and analysing respiratory gases. So these two young men, the one a surgeon with an insistent idea, the other still a student, but bringing essential technique to the joint equipment, embarked bravely on an enterprise which, through a Canadian summer, was to make demands on all their reserves of determination, conviction, and personal devotion. By dint of all these they succeeded in a few months in demonstrating directly that the hormone insulin had real existence, and that it could be extracted in relatively permanent form, under appropriate conditions.

This was the first essential step. When once the possi-

bility of extracting insulin had been established, other workers, first in the Toronto laboratories, led and organized by Macleod, and soon in many laboratories in many countries, contributed to the knowledge of its properties and to the discovery of methods for its purification. Such studies led eventually, and with a rapidity which would have seemed incredible when its existence was first demonstrated, and which still seems astonishing in retrospect, to the crystallization of pure insulin as a metallic salt. With all this further development, however, Banting had little concern. As soon as its partial purification had made clinical trials possible, he had centred his interest on the practical application of insulin in the treatment of diabetes; his Nobel Lecture in 1925 reviewed the clinical results obtained with it to that date. It was rather noteworthy, indeed, how soon he seemed ready to leave to others the further investigation of the properties of insulin and the mode of its action, and to direct his own researches to other objectives. It may be suspected that more than one influence was concerned in this decision. Banting would certainly be aware that such further developments required a fundamental equipment, especially on the chemical side, which he had had no chance of acquiring. He had shown, thus early in life, what he could do by natural insight in alliance with an iron determination, and without any normal apprenticeship in research. The best reward, from his point of view, would probably have been an opportunity to make good such defects of equipment by some years of quiet and disciplined study in the world's most productive centres of research, and then to return to researches chosen for himself in the light of the wider experience. Conditions, in any case, conspired to make such an arrangement difficult, or impossible. No other medical discovery in living memory has so caught the public interest as the discovery of insulin; and Banting, in particular, soon found himself, to his embarrassment, a mark for popular enthusiasm and excited expectation, in Canada first, and later in the world at large. Money was freely forthcoming, and it would have been difficult for those in authority to avoid founding a Banting Institute for Medical Research, with a Research Chair for himself as its director, or for Banting to refuse such a flattering opportunity. The whole atmosphere of haste and exaltation, however, could not fail to be detrimental. In spite of all pleas for patience and caution from those who were soberly concerned for Banting's future and for his further value to medical research, he had become a public figure; everything concerning him was "news," and the world at large had been taught what to expect. Every few months a new rumour was set afloat in the popular press, attributing some fresh discovery to Banting. I remember being asked myself, over the telephone, whether it was likely that he had discovered a cure for metabolism. His comings and goings were chronicled like those of any film-star.

Even a research worker of long experience and established repute would have found himself inhibited by such an atmosphere. When half the world is agape for a miracle it takes unusual courage to offer it the results of some sound and necessary but unexciting piece of

spadework. The matter for surprise is, not that Banting should have seemed for a time to be somewhat embarrassed, but that he should, in the end, have been so little deflected from the proper use of the opportunity which had been given to him. For a few years, indeed, he seemed to feel a constraint towards problems of the kind which popular rumour expected him to solve. Before long, however, he had settled down to a good and varied programme of important but relatively long-range researches, gathering round him a group of collaborators whose training could supplement at different points what was lacking in his own. There was no further discovery like that of insulin, but he and his group did work of substantial and permanent value, for example, on the difficult problem of silicosis, which was a matter of growing concern to the mining industry of Canada.

Whenever I met Banting in these more recent years, before the war broke out, I was impressed not only, as always, by his native keenness and alert intelligence, but by his steadily maturing judgment, and by the essential modesty and quiet firmness of his character. It is idle to speculate as to what he might have achieved if he had lived into a further period of normal activity. The war diverted him, like others, to abnormal duties. A deep glow of patriotic devotion to the British Empire and to Canada was always a central motive with him, and I think that he would have been content if he had known that death on national duty was before him. Apart from the relief and the new prospect of useful life which insulin has given to unnumbered sufferers from diabetes, it is a commonplace that its discovery has had a revolutionary effect on the progress of knowledge concerning the nature of normal carbohydrate metabolism. Perhaps it is not so generally recognized how much wider its influence has been. In 1921 only two relatively simple and stable hormones, adrenaline and thyroxine, had been chemically isolated. Secretin and the post-pituitary hormones, being thermostable and of comparatively small molecular dimensions, had been obtained in extracts, but attempts at their further isolation had ended in discouragement. For the rest, the endocrine function of the other ductless glands was itself little more than a deduction from the results of extirpation and grafting. Their hormones, it was supposed, might be too complex and unstable to be handled, or they might be secreted as fast as they were formed, without accumulation of a store which could yield an active extract. The possibility of progress towards their isolation and chemical study seemed depressingly remote. The separation of insulin from the pancreas was not only an achievement in itself; it had an immense effect of encouragement to workers over the whole field of endocrinology. The whole position has since been transformed at a rate which would have seemed incredible in 1921. Other previously hopeless conditions of endocrine deficiency have been brought under successful treatment, and a number of hormones whose very existence was then a matter of inference have now been not only isolated but even made by artificial synthesis. In paying our tribute to the memory of Frederick Banting, for ever to be associated with the discovery of insulin, it seems fitting that we should remember also the stimulating influence of that discovery on so much that has followed.

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